Translation

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference P800310/WO/1	**FOR FURTHER ACTION**	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
International application No. PCT/EP2003/005272	International filing date (*day/month/year*) 20 May 2003 (20.05.2003)	Priority date (*day/month/year*) 05 July 2002 (05.07.2002)
International Patent Classification (IPC) or national classification and IPC H01M 8/06		
Applicant DAIMLERCHRYSLER AG		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 7 sheets, including this cover sheet.

   ☒ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

   These annexes consist of a total of 7 sheets.

3. This report contains indications relating to the following items:

   - I ☒ Basis of the report
   - II ☐ Priority
   - III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
   - IV ☐ Lack of unity of invention
   - V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
   - VI ☐ Certain documents cited
   - VII ☐ Certain defects in the international application
   - VIII ☐ Certain observations on the international application

Date of submission of the demand 18 November 2003 (18.11.2003)	Date of completion of this report 05 April 2004 (05.04.2004)
Name and mailing address of the IPEA/EP Facsimile No.	Authorized officer Telephone No.

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.
PCT/EP2003/005272

I. Basis of the report

1. With regard to the **elements** of the international application:*

☐ the international application as originally filed

☒ the description:
pages 1, 2, 5-11, as originally filed
pages _____, filed with the demand
pages 3, 4, 4a, filed with the letter of 17 March 2004 (17.03.2004)

☒ the claims:
pages _____, as originally filed
pages _____, as amended (together with any statement under Article 19
pages _____, filed with the demand
pages 1-15, filed with the letter of 17 March 2004 (17.03.2004)

☒ the drawings:
pages 1/1, as originally filed
pages _____, filed with the demand
pages _____, filed with the letter of _____

☐ the sequence listing part of the description:
pages _____, as originally filed
pages _____, filed with the demand
pages _____, filed with the letter of _____

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.
These elements were available or furnished to this Authority in the following language _____ which is:

☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).

☐ the language of publication of the international application (under Rule 48.3(b)).

☐ the language of the translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

☐ contained in the international application in written form.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. ☐ The amendments have resulted in the cancellation of:

☐ the description, pages _____

☐ the claims, Nos. _____

☐ the drawings, sheets/fig _____

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**

* *Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rule 70.16 and 70.17).*

** *Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.*

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.
PCT/EP 03/05272

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	1-15	YES
	Claims		NO
Inventive step (IS)	Claims	1-15	YES
	Claims		NO
Industrial applicability (IA)	Claims	1-15	YES
	Claims		NO

2. Citations and explanations

1. Documents

D1: WO 02 22234 A (DONALDSON CO INC) 21 March 2002 (2002-03-21)

D2: WO 02 054521 A (EMITEC EMISSIONSTECHNIK; POPPINGER MANFRED (DE); BRUECK ROLF (DE)) 11 July 2002 (2002-07-11)

D3: WO 01 03212 A (EMITEC EMISSIONSTECHNIK; KONIECZNY JOERG ROMAN (DE); POPPINGER MAN) 11 January 2001 (2001-01-11)

D4: EP-A-0 476 610 (ISHIKAWAJIMA HARIMA HEAVY IND; TOHO GAS KK (JP); OSAKA GAS CO LTD) 25 March 1992 (1992-03-25)

D5: US-B1-6 316 134 (EICHE MICHAEL ET AL) 13 November 2001 (2001-11-13)

D6: NADAL M ET AL: 'Development of a hybrid fuel cell/battery powered electric vehicle' INTERNATIONAL JOURNAL OF HYDROGEN ENERGY, ELSEVIER SCIENCE PUBLISHERS B.V., BARKING, GB, Vol. 21, No. 6, June 1996 (1996-06), pages 497-505, XP004174980 ISSN: 0360-3199

D7: US-A-5 944 878 (LINDHE CURT) 31 August 1999 (1999-08-31)

D8: DE 199 02 219 C (DAIMLER CHRYSLER AG) 8 June 2000 (2000-06-08)

2. Amendments

The amendments submitted with the letter of 17 March 2004

meet the requirements of PCT Article 34(2). The amendments relate to the combination of claims as submitted in the original and the addition of claims based on page 9 of the description. The amendments with respect to the description relate to acknowledging the prior art and bringing the description into line with the new claims.

3. Novelty

The subject matter of claims 1-15 is considered novel (PCT Article 33(1) and (2)) for the following reasons:

Document D1 discloses an air filter system for low temperature catalytic processes, e.g. fuel cells. A wide variety of particles and gases/steams are filtered out of the incoming air (page 1, lines 13-24). The filters differ from one another in the disclosed system in physical or particle filters and chemical filters. The filters are connected in series in a housing (page 3, lines 12ff.). The filters can be designed as a panel or also as a cylinder (figures 2, 3). The physical or particle filters can be connected in series with different degrees of fineness. The chemical filter is designed according to the requirements, and acid or basic filters for neutralisation are indicated as examples, as well as pure adsorbents or oxidising filters (pages 8-12). If the toxic material in the air supplied falls below a specific concentration, the chemical filter is regenerated by spontaneous desorption (page 11, line 28).

Since the prior art does not disclose any monitoring of the filter system or concomitant initiation of the regeneration process, the subject matter of independent method claim 1, independent product claim 5 and of all the dependent claims is considered novel (PCT Article 33(1), (2)).

4. Inventive step

The subject matter of claims 1-15 involves an inventive step (PCT Article 33(3)).

4.1 The technical problem addressed by the present application is the preparation of gases, specifically ambient gases, by a filter system for subsequent use in a fuel cell and controlled regeneration of said filter system.

4.2 This problem is known in the prior art, but solved in a different manner - see point 3, document D1.

4.3 Document D6 discloses a fuel cell in a motor vehicle whose incoming air is likewise filtered, compressed and monitored. The pressure difference and flow rate serve as measured variables (page 501, first paragraph).

Document D3 discloses the use of rough and fine particle filters for cleaning process gases for fuel cells.

Document D4 discloses the combination of a filter and a compressor for the preparation of the process gases for a fuel cell.

Document D5 likewise discloses the combination of a filter and a compressor for the preparation of the oxidant for a fuel cell.

Document D7 discloses a filter system consisting of particle filters and chemical filters for the preparation of ambient air for an enclosed space. The filters in question use a wide variety of techniques for filtering substances, for example adsorption via van der Waal

forces, molecular sieves, polar or acid or basic molecules, etc.

Document D8 discloses a fuel cell whose incoming air is filtered.

4.4 Proceeding from the closest prior art (D1) and the further disclosures (see point 4.3), the subject matter of claims 1 and 5 cannot be derived from the present prior art. No document - either alone or in combination with a further document - suggests monitoring the effect of the filter by a sensor which, when a desired value is not reached, triggers the regeneration of the filter via a control mechanism. The subject matter of the present application is therefore deemed inventive.

5. Certain published documents (PCT Rule 70.10)

Patent no.	Publication date	Filing date	Priority date
WO02054521	11.07.2002	21.12.2001	29.12.2000

Document D2 discloses a fuel cell for use in a motor vehicle and a method for operating same. A wide variety of particles and gases/steams are filtered out of the air that is taken in (page 2, lines 20ff.). The filters are connected in series in a housing and can be expanded as required to form an n-stage multifunction filter. The particle filters can be connected in series with varying degrees of fineness, and the chemical filter is designed as an adsorption filter. The disclosure of D2 will be relevant to novelty in the European phase.

6. Industrial applicability

The subject matter of the present application is

industrially applicable in the field of fuel cell technology in motor vehicles.